We claim:

1. A method of depositing a silicon carbide film on a substrate by chemical vapor deposition, comprising

   (a) placing at least one substrate in a reaction chamber;

   (b) supplying silicon precursor to the reaction chamber at a predetermined fixed flow rate;

   (c) supplying carbon precursor to the reaction chamber at a predetermined fixed flow rate;

   (d) controlling the stress in the deposited silicon carbide film by controlling pressure in the reaction chamber.

2. The method of claim 1, wherein the substrate is silicon.

3. The method of claim 1, wherein the substrate is silicon dioxide or silicon carbide.

4. The method of claim 1, wherein the silicon carbide comprises polycrystalline silicon carbide.

5. The method of claim 1, wherein the predetermined flow rate of the silicon precursor is about 54 standard cubic centimeters per minute.

6. The method of claim 1, wherein the silicon precursor is selected from the group consisting of silane, halosilane, trimethylsilane, tetramethylsilane, dimethyldimethoxysilane, tetramethylcyclotetrasiloxane, bis-trimethylsilylmethane, methyltrichlorosilane, silane, tetraethylsilane, and silacyclobutane.

7. The method of claim 6, wherein the halosilane is selected from the group consisting of dichlhorosilane, trichlorosilane, and tetrachlorosilane.

8. The method of claim 7, wherein the silicon precursor is dichlorosilane.

9. The method of claim 1, wherein the pressure in the reaction chamber is controlled between about 0.42 torr and about 5 torr.

10. The method of claim 9, wherein the pressure in the reaction chamber is controlled at about 2.65 torr.

11. The method of claim 1, wherein the pressure in the reaction chamber is controlled to minimize residual stress in the deposited silicon carbide film.

12. The method of claim 11, wherein the residual stress in the deposited silicon carbide film is between about 700 MPa and about -100 MPa.

13. The method of claim 11, wherein the pressure in the reaction chamber is controlled at about 2.65 torr.

14. The method of claim 1, further comprising maintaining the reaction chamber at a fixed temperature.

15. The method of claim 14, wherein the fixed temperature is about 900 °C.

16. The method of claim 1, wherein the predetermined flow rate of the carbon precursor is about 180 standard cubic centimeters per minute.

17. The method of claim 1, wherein supplying carbon precursor comprises supplying acetylene in hydrogen to the reaction chamber at a flow rate of about 180 standard cubic centimeters per minute.

18. The method of claim 1, further comprising controlling the electrical resistivity of the silicon carbide.

19. The method of claim 18, wherein the electrical resistivity of the deposited silicon carbide is less than about 10 Ω·cm.

20. The method of claim 18, wherein controlling the electrical resistivity comprises controlling the pressure in the reaction chamber.

21. A method of depositing a silicon carbide film on a substrate by chemical vapor deposition, comprising

(a) placing at least one substrate in a reaction chamber;

(b) maintaining the reaction chamber at a predetermined pressure;

(c) supplying carbon precursor to the reaction chamber at a predetermined fixed flow rate;

(d) supplying silicon precursor to the reaction chamber at a flow rate; and

(e) controlling the silicon precursor flow rate to control the stress in the deposited silicon carbide film.

22. The method of claim 21, wherein the substrate is silicon.

23. The method of claim 21, wherein the substrate is silicon dioxide.

24. The method of claim 21, wherein the silicon carbide comprises polycrystalline silicon carbide.

25. The method of claim 21, wherein the predetermined pressure is about 2.0 torr.

26. The method of claim 21, wherein the silicon precursor is selected from the group consisting of silane, halosilane, trimethylsilane, tetramethylsilane, dimethyldimethoxysilane, tetramethylcyclotetrasiloxane, bis-trimethylsilylmethane, methyltrichlorosilane, silane, tetraethylsilane, and silacyclobutane.

27. The method of claim 26, wherein the halosilane is selected from the group consisting of dichlhorosilane, trichlorosilane, and tetrachlorosilane.

28. The method of claim 27, wherein the silicon precursor is dichlorosilane.

29. The method of claim 21, wherein the flow rate of the silicon precursor is controlled between about 18 standard cubic centimeters per minute and about 54 standard cubic centimeters per minute.

30. The method of claim 29, wherein the flow rate of the silicon precursor is controlled at about 36 standard cubic centimeters per minute.

31. The method of claim 21, wherein the flow rate of the silicon precursor is controlled to minimize residual stress in the deposited silicon carbide film.

32. The method of claim 31, wherein the residual stress in the deposited silicon carbide film is between about 700 MPa and about -100 MPa.

33. The method of claim 31, wherein the flow rate of the silicon precursor is controlled at about 36 standard cubic centimeters per minute.

34. The method of claim 21, further comprising maintaining the reaction chamber at a fixed temperature.

35. The method of claim 34, wherein the fixed temperature is about 900 °C.

36. The method of claim 21, wherein the predetermined flow rate of the carbon precursor is about 180 standard cubic centimeters per minute.

37. The method of claim 21, wherein supplying carbon precursor comprises supplying acetylene in hydrogen to the reaction chamber at a flow rate of about 180 standard cubic centimeters per minute.

38. The method of claim 21, further comprising controlling the electrical resistivity of the silicon carbide.

39. The method of claim 38, wherein the electrical resistivity of the deposited silicon carbide is less than about 10 $\Omega \cdot cm$.

40. The method of claim 38, wherein controlling the electrical resistivity comprises controlling the flow rate of the silicon precursor.

41. A method of controlling the stress of a silicon carbide film during deposition of the silicon carbide film on a substrate to achieve desired stress values comprising

(a) placing at least one substrate in a reaction chamber;

(b) supplying silicon precursor to the chamber at a predetermined fixed flow rate;

(c) supplying carbon precursor to the chamber at a predetermined fixed flow rate;

(d) controlling the pressure in the reaction chamber to achieve the desired stress values.

42. A method of controlling the stress of a silicon carbide film during deposition of the silicon carbide film on a substrate to achieve desired stress values comprising

(a) placing at least one substrate in a reaction chamber;

(b) maintaining the reaction chamber at a predetermined pressure;

(c) supplying carbon precursor to the chamber at a predetermined fixed flow rate;

(d) controlling the flow rate of silicon precursor provided to the chamber to achieve the desired stress values.

43. A substrate having a silicon carbide film deposited thereon, wherein the silicon carbide film has a residual stress of between about 100 MPa and about -100 MPa

44. The substrate of claim 43, wherein the electrical resistivity of the silicon carbide film is less than about 5 Ω·cm.

45. The substrate of claim 43, wherein the residual stress is about 0 MPa.

46. The substrate of claim 43, wherein the substrate is a silicon wafer or silicon chip.

47. A micromechanical, microelectromechanical, nanomechanical, or nanoelectromechanical device comprising a substrate having a silicon carbide film deposited thereon, the silicon carbide film having a residual stress of between about 100 MPa and about -100 MPa, and electrical resistivity less than about 5 Ω·cm.

48. A micromechanical, microelectromechanical, nanomechanical, or nanoelectromechanical device comprising a substrate having a silicon carbide film deposited thereon by the method of claim 1.

49. A micromechanical, microelectromechanical, nanomechanical, or nanoelectromechanical device comprising a substrate having a silicon carbide film deposited thereon by the method of claim 21.

50. A method of depositing a ceramic film on a substrate to achieve a desired residual stress in the film comprising:

(a) placing at least one substrate in a reaction chamber;

(b) maintaining the reaction chamber at a predetermined fixed temperature;

(c) supplying metallic element precursor to the reaction chamber at a predetermined fixed flow rate;

(d) supplying a nonmetallic element precursor to the reaction chamber at a predetermined fixed flow rate; and

(e) controlling the stress in the deposited silicon carbide film by controlling pressure in the reaction chamber.

51. The method of claim 50, wherein the film is a compound semiconductor film.

52. A method of depositing a ceramic film on a substrate to achieve a desired residual stress in the film comprising:

(a) placing at least one substrate in a reaction chamber;

(b) maintaining the reaction chamber at a predetermined fixed temperature;

(c) maintaining the reaction chamber at a predetermined fixed pressure;

(d) supplying a nonmetallic element precursor to the reaction chamber at a predetermined fixed flow rate;

(e) supplying a metallic element precursor to the reaction chamber at a flow rate; and

(f) controlling the metallic element precursor flow rate to achieve the desired residual stress in the deposited silicon carbide film.

53. The method of claim 52, wherein the film is a compound semiconductor film.